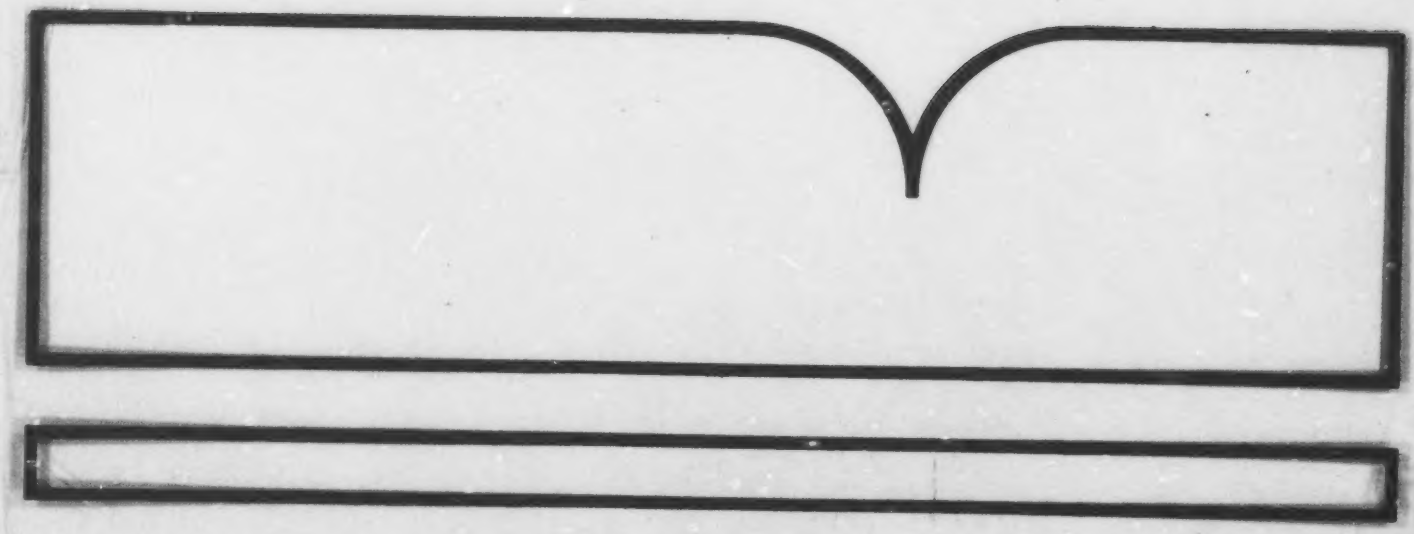
PB85-213825

Superfund Record of Decision (EPA Region 3)
Lehigh Electric Site
Old Forge, Pennsylvania, February 1983

(U.S.) Environmental Protection Agency
Washington, DC

11 Feb 83



U.S. Department of Commerce
National Technical Information Service

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R03-83/005
February 1983

PB85-213825

EPA

Superfund Record of Decision:

Lehigh Electric Site, PA

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

The LeHigh Electric and Engineering Company site is located in Old Forge, Pennsylvania and encompasses approximately 6.4 acres of property adjacent to the Lackawanna River. Since the early 1960's the site has been used by LeHigh Electric as an electrical equipment repair and storage yard. The hazardous conditions at the site were created by indiscriminate handling and disposal of PCBs. The site investigation found that PCBs are concentrated in the surface soil layers from undetectable to 110,000 ppm.

The cost-effective remedial action selected for the site includes excavation and off-site disposal of soils with a PCB concentration of 50 ppm or greater; additional soil excavation and removal where cost-effective; demolition of the buildings on-site; backfilling, grading, and vegetating of the site to minimize erosion and to control percolation and run-off. The estimated capital cost for this remedial action is $6,401,000 and monitoring and maintenance costs for the site over a 30-year period is $46,000.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision: Lehigh Electric Site, PA Contaminated media: soil Key contaminants: PCBs		

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FEB 11 1983

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

Site: Lehigh Electric and Engineering Company, Inc. Old Forge, Lackawanna County, Pennsylvania

Documents Reviewed

I have reviewed the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Lehigh Electric Site:

- Study titled "Remedial Feasibility Report, Lehigh Electric and Engineering Site, Old Forge, Pennsylvania", November, 1982.
- Study titled "Remedial Field Investigation Report, Lehigh Electric and Engineering Site, Old Forge, Pennsylvania", September, 1982.
- Staff summaries and recommendations
- Recommendation by the Pennsylvania Department of Environmental Resources.

Declarations

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the National Oil and Hazardous Substances Contingency Plan, I have determined that the excavation of contaminated soils and debris and their transportation to an EPA approved landfill for secure burial provides an appropriate level of clean-up. The action taken is a cost-effective remedy, and it effectively and reliably mitigates and minimizes damage to, and provides adequate protection of public health, welfare and the environment. I have also determined that the action taken is appropriate when balanced against the need to use Trust Fund money at other sites. In addition, the chosen remedy complies with the requirements of Section 101(24) of CERCLA because off-site disposal is more cost-effective than potential onsite remedies and necessary to protect public health and the environment.

Michael A. Brown
Acting Assistant Administrator
Office of Solid Waste and Emergency Response

REMEDIAL IMPLEMENTATION ALTERNATIVE SELECTION
LEHIGH ELECTRIC AND ENGINEERING SITE
OLD FORGE, LACKAWANNA COUNTY, PENNSYLVANIA

Record of Decision Summary Sheet

EPA has completed the following remedial Superfund activities at the Lehigh Electric Site located in Old Forge, Pennsylvania.

Activity	Date Completed
Phase I Clean-up of Site (equipment removal)	October, 1982
Phase II Site Investigation Report (soil removal)	September, 1982
Phase II Feasibility Study Report	November, 1982
Public Meeting	January 10, 1983

Region III has reviewed the information in each report and has given careful consideration to the comments received during the public comment period. Based on our review, EPA Region III has determined that the following actions at the site are cost-effective and effectively mitigate and minimize damage to and provide adequate protection of public health, welfare, and the environment.

Action	Estimated Cost
Excavation and Off-Site Disposal	$5,761,000
Demolition of Buildings	$190,000
Backfilling, Grading, and Vegetating of Site	$450,000
Total	$6,401,000

Monitoring and maintenance costs for the site are estimated to be $46,000 (present worth dollars) for a period of thirty years.

FEB 01 1983
Date

Peter N. Bibko
Regional Administrator

NARRATIVE SUMMARY

History

The Lehigh Electric and Engineering Company Site, located just east of the intersection of South Main and Howard Streets, in Old Forge, Pennsylvania encompassess approximately 6.4 acres of property adjacent to the Lackawanna River (see Attachment A). The site was initially a portion of a coal processing facility, but since the early 1960's has been used by Lehigh Electric as an electrical equipment repair and storage yard. The hazardous condition existing at the site was created by the indiscriminate handling and disposal of dielectric fluid containing polychlorinated biphenyls (PCBs).

The Environmental Protection Agency (EPA) was first notified of the site in March of 1981 by an anonymous source. The Regional On-Scene Coordinator found that elevated levels of PCB's were present in the soil (110,000ppm) and determined that the site must be secured. In April of 1981, a sixfoot high chain-link fence was erected around the perimeter of the site. By June of 1981, the OSC had secured and assessed the site, determined that PCB contamination did indeed exist, and that the contamination did not migrate off-site to nearby residential areas. At that point, it was decided that no further emergency activity was needed at the site, and that remedial clean-up activity under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) should be pursued.

Funding under CERCLA was authorized in October of 1981. Roy F. Weston, Inc. was tasked to perform the site engineering work. The strategy was to perform the clean-up in two phases, since we had to deal not only with contaminated medium (in this case, soil), but also with the source of the PCB contamination, the thousands of pieces of electrical equipment on-site.

Phase I of the clean-up (equipment removal) was "fast-tracked". Upon completion of the Site Investigation/Feasibility Study by Weston, the U.S. Army Corps of Engineers, working under an Interagency Agreement, assisted EPA in the design review and were responsible for assembling a bid package and procuring the clean-up contractor. In July of 1982, CECOS International was awarded the contract for Phase I clean-up. Removal of all surface equipment and debris (except buildings) was completed in October of 1982.

Current Status

The Phase II Site Investigation was performed by Weston. The objective was to determine the degree and extent of soil contamination. Generally, it was found that PCBs are concentrated in the surface soil layers (0 to 2 feet), with concentrations decreasing with depth. Concentrations in the soil samples ranged from undetectable (less than 0.1 ppm) to 110,000 ppm. In general, most levels were less than 500 ppm and quickly dropped

off to less than 50 ppm at increasing depths. The highest contamination was found in surface soil samples. The deepest levels at which PCB concentrations of 50 ppm are found are 10 and 15 feet below the surface. Analytical results of samples taken from the Lackawanna River and wells drilled on-site indicate that the site is not measurably impacting the surface or ground water.

After completion of the site investigation, work on a feasibility study began. During the initial phase of the feasibility study, remedial options which could be utilized for the clean-up of contaminated soil at the Lehigh Electric site were screened, and their implementability determined. The options considered included:

- Site Management
- Site Capping
- On-Site Waste Stabilization (Chemical Destruction)
- Waste Excavation with Off-Site Disposal
- On-Site Encapsulation
- On-Site Waste Incineration
- On-Site Biodegradation of Waste

Several factors used in screening the options were:

- Technical Feasibility
- Cost Effectiveness
- Environmental Effectiveness
- Implementation Time Frame

As a result of the screening process, the following options were excluded from being evaluated further (alone or in combination with other options) in the feasibility study:

Site Capping Only - Due to the high concentrations of PCBs in the soil (up to 110,000 ppm), the estimated quantity of PCBs on-site (27.5 tons), and the incidence of mine subsidence in the area, the long-term integrity of a cap system is questionable. Therfore, it was determined that site capping alone is not an adequate remedial measure to protect public health.

On-Site Waste Stabilization - Chemical destruction of PCB-contaminated soil is in the experimental stages and is unproven technology.

On-Site Waste Incineration - There are no mobile incinerators permitted to operate in Pennsylvania. Operating costs would also be excessive making this option not cost-effective.

On-Site Biodegradation of Waste - Although this method has been shown to be effective for some types of hazardous waste, it is not a proven technology for use with PCB contamination at this time.

The remaining remedial options were evaluated in detail (alone or in combination) in the feasibility study and were used to formulate alternative site clean-up strategies. The feasibility study published by Weston (Attachment B) identifies alternatives for remedial action at the Lehigh Electric Site. These alternatives and their associated costs are presented below:

Alternative	Estimated Capital Cost
1. No Action	$10,000
2. Removal to 10 ppm & Site Management	$7,546,000
3. Removal to 10 ppm & Site Capping	$7,725,000
4. Removal to 50 ppm & Site Management	$6,140,000
5. Removal to 50 ppm & Site Capping	$6,284,000
6. Removal to 50 ppm & Encapsulation of 10 to 50 ppm On-Site	$6,448,000
* 7. Removal to 50 ppm with additional excavation where cost-effective and site management (Number 4 Modified)	$6,401,000

(O&M costs range from $34K to $54K for all options except "No Action", which is $135,000.)

Each alternative except "No Action" required as a minimum the removal from the site of all soil with PCB concentration of 50 ppm or greater. Further, based on the results of a preliminary endangerment assessment, it is determined that the "No Action" option results in upper limits of excess cancer risk and measures of reproductive risks which are in the ranges that generally cause concern. As a result, we have determined that the "No Action" option is not acceptable.

Public Input

On January 10, 1983, a public meeting and a press briefing were conducted in Old Forge, Pennsylvania to describe the various alternatives (the alternatives 1-6 above) and to discuss the Phase II portion of the site clean-up. During the public comment period which followed the meeting, we received letters and petitions from the community demanding that we implement the alternative calling for removal to 10 ppm with capping at an estimated cost of $7,725,000. They insisted that the lower the concentration level of PCBs remaining on site, the lower the risk to the community will be in future years.

* Alternative 7 was added to the feasibility study after the public comment period, and in response to the public comments.

We believe that implementation of alternative 3 would not be cost-effective. However, as a result of public comments, we devised a modification to alternative 4 (Alternative 7, above) which would reduce the concentration levels of PCBs remaining on site to substantially below 50 ppm for a fraction of the cost difference between alternatives 3 and 4. The modification includes additional soil excavation below the 50 ppm concentration level when it is determined to be cost-effective.

On January 31st we met with citizen leaders of the community (the PCB Committee) to discuss this modified alternative. They reacted positively, and we believe that their concerns will be satisfied if this cost-effective method for site clean-up is implemented.

Recommended Alternative

Section 300.68(j) of the National Contingency Plan (NCP) [47FR 31180, July 16, 1982] states that the appropriate extent of remedy shall be determined by the lead agency's selection of the remedial alternative which the agency determines is cost-effective (i.e., the lowest cost alternative that is technologically feasible and reliable) and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment. Based on our evaluation of the cost-effectiveness of each of the proposed alternatives, the comments received from the public, information from the Site Investigation and Feasibility Study Reports, and information from the State, we developed Alternative 7 above. This alternative includes: excavation and off-site disposal of soils with a PCB concentration of 50 ppm or greater; additional soil excavation and removal where cost-effective (i.e., substantial PCB removal for small incremental cost increase); demolition of the buildings on-site; backfilling, grading, and vegetating of the site to minimize erosion and to control percolation and run-off. We have determined that implementation of this alternative will effectively mitigate damage to and provide adequate protection of public health, welfare, and the environment.

The methodology for determining whether additonal soil excavation is cost-effective involves subdivision of certain grids (based upon data from the Site Investigation Report) once removal to 50 ppm has been achieved. Soil samples will be collected in the subgrids and analyzed for PCB concentration. The Government's on-site representative (i.e. Corps of Engineers Inspector) will evaluate the results and decide whether or not a significant amount of PCB-contaminated soil could be removed from the site with little additional excavation and cost.

The capital cost for this alternative is estimated to be $6,401,000. The monitoring and maintenance costs are estimated to be $46,000 (present worth value) for a period of thirty years. A breakdown of the capital costs appear in Attachment E.

State Input

After giving careful consideration to the cost-effectiveness of each alternative and evaluating the public comments EPA had received, the Pennsylvania Department of Environmental Resources recommended that we implement an alternative (now designated as Alternative 7) calling for removal of soil with PCB concentrations of 50 ppm or greater with additional cost-effective excavation and site management. A letter confirming the State's decision appears as Attachment D.

Proposed Action

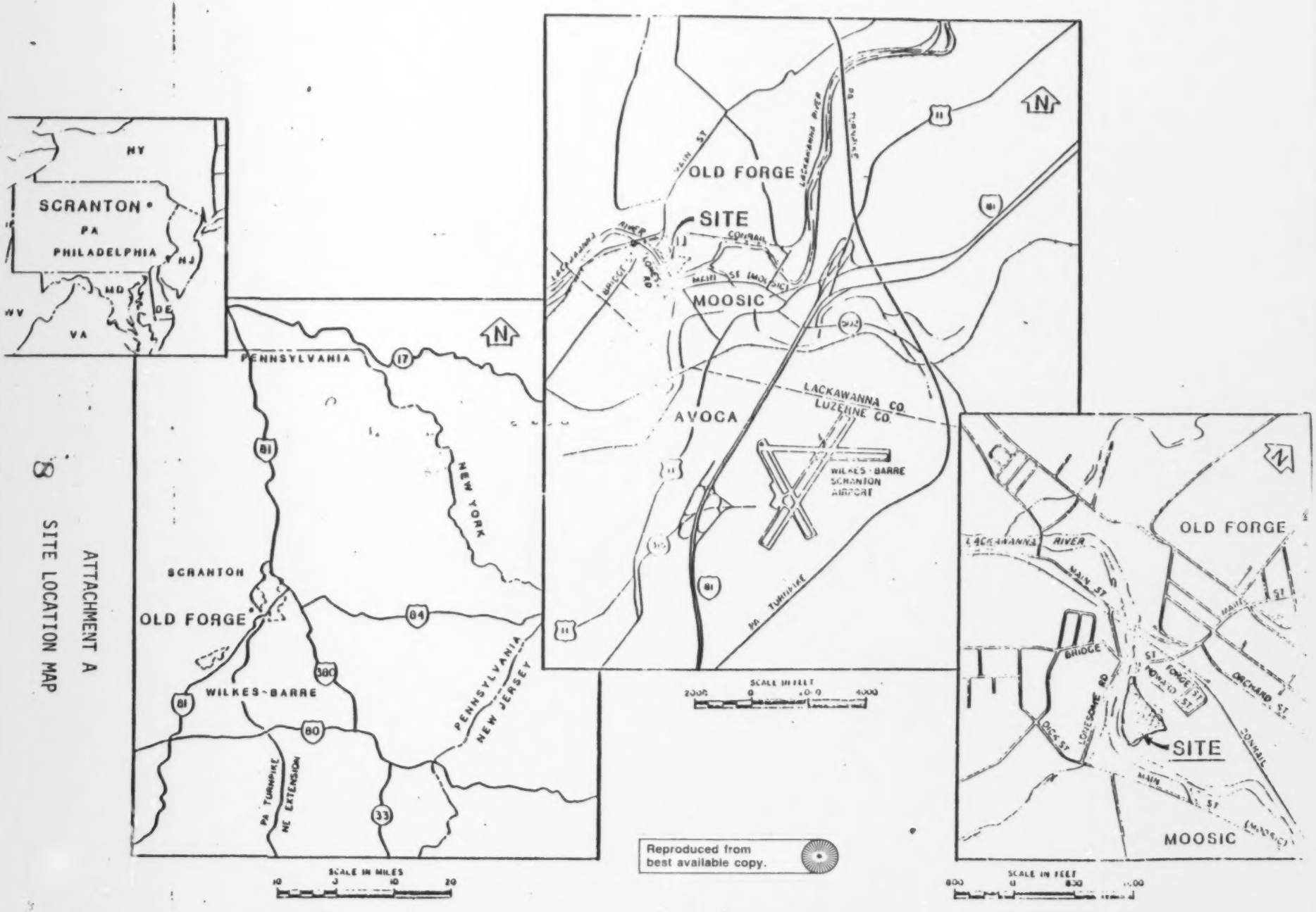
We request your approval of the removal to 50 ppm with additional cost-effective excavation and site management as the remedial implementation option for the Phase II Lehigh Electric Site clean-up. In addition, we request an allocation of $6,401,000 for the project. An allocation of $300,000 for the preparation of the plans and specifications for the clean-up has already been made.

Tentative Schedule

Initiate Design	February 1983
Complete Design	May 1983
Initiate Clean-up	August 1983
Complete Clean-up	December 1983

If you have any questions, please call Anthony S. Bartolomeo at (FTS)597-9100.

Attachments



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ATTACHMENT A

SITE LOCATION MAP

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
Post Office Box 2063
Harrisburg, Pennsylvania 17120
February 2, 1983

(717) 787-9871

Mr. Anthony S. Bartolomeo
U.S. Environmental Protection Agency
Region III
Sixth and Walnut Streets
Philadelphia, PA 19106

Dear Mr. Bartolomeo:

The Department of Environmental Resources, Bureau of Solid Waste Mangement has completed its evaluation of the Phase II remedial action alternative for the Lehigh Electric site contained in the November, 1982 Remedial Feasibility Report prepared by Roy F. Weston, Consulting Engineers.

It is our opinion, based upon the documentation contained in the Feasibility Report and the additional data provided to DER by EPA on January 31, 1983, that the most applicable remedial clean-up option for this site is a modification of alternative 4. The Bureau believes that the environmental effectiveness and technical feasibility of this modified alternative, coupled with the long-term operation and maintenance responsibilities of the Commonwealth provide a reliable, practical and implementable solution for the site.

The removal of the transformers, electrical equipment, and miscellaneous wood and debris during the first phase of this project disturbed surface soils and the original grid stakes. Because of this fact and the need to ensure that the implementation of this clean-up alternative removes the PCB contaminated soils to a level of 50 ppm or less, we believe alternative 4 should be modified to include the removal of a minimum of 6" of soil from the entire property (The Hot Area) currently bounded by the fence. Moreover, consideration should be given to the removal of extra contaminated soils where it is cost effective, i.e., beyond the depths specified in alternative 4 and the supporting documentation.

A quality assurance program approved by DER and EPA must be developed and utilized by the selected clean-up contractor at this site to insure that the clean-up objective is met. In light of the physical location of this site, the issues of flooding and mine subsidence must be specifically addressed in the design to be approved by our agencies to ensure that the integrity of the alternative finally selected is not compromised.

It should be further understood that once an alternative for the clean-up of this site is finally selected by our respective agencies, the nature and extent of operation and maintenance activities will be jointly agreed upon by DER and EPA for this site.

If you have any questions or comments on the recommended alternative or other remarks contained in this correspondence, please do not hesitate to contact me.

Sincerely,

JAMES P. SNYDER, Assistant Director
Bureau of Solid Waste Management

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
Post Office Box 2063
Harrisburg, Pennsylvania 17120
January 31, 1983

Office of the Deputy Secretary
Environmental Protection

Mr. Peter N. Bibko
Regional Administrator
U.S. Environmental Protection Agency
Region III
Sixth and Walnut Streets
Philadelphia, PA 19106

Dear Mr. Bibko:

This is to confirm the intent of the Pennsylvania Department of Environmental Resources to provide for its 10% State Superfund match for Phase 2 remedial action activities at the Lehigh Electric site in Lackawanna County. It is understood that the exact amount of funding is not precisely known at this time, but will be determined more accurately after a final remedial action alternative is chosen and jointly agreed upon by DER and EPA. Precise remedial action costs and the associated 10% State share will be agreed upon in a contract that we anticipate executing with EPA prior to commencing remedial activities at the Lehigh Electric Site.

I believe that the foregoing information is sufficient to indicate this Department's intent to assure State funding and enter a contract for the Lehigh Electric site. If you have any questions or comments, please contact either Dwight Worley, Chief, Division of Operations, at 717-787-7383 or James P. Snyder, Assistant Director, Bureau of Solid Waste Management, at 717-787-9871.

Sincerely,

William B. Middendorf

WILLIAM B. MIDDENDORF

Cost Estimate -- Alternative 4 (Modified)

	Description	Quantity	Unit Cost	Total Cost
1.	Regulated soil for secure disposal [1]	19,300 tons (13,000 C.Y.)	$ 170/ton	$ 3,281,000
2.	Low level soil for off-site disposal [2]	600 tons (400 C.Y.)	$ 170/ton	$170,000
3.	Low level soil for on-property burial	1,500 tons (1,000 C.Y.)	$ 6/ton	9,000
4.	Trace soil for on-property burial	2,100 tons (1,400 C.Y.)	$ 6/ton	12,600
5.	Additional soil for off-site disposal	1,800 tons (1,200 C.Y.)	$ 170/ton	306,000
6.	Wastewater	920,000 gal.	$ 0.15/gal.	138,000
7.	Structure demolition and placement of rubble and gravel [3]	L.S.		70,000
8.	Secure Disposal/ decontamination of Miscellaneous Concrete pads	72 tons	$ 208/ton	15,000
9.	Clean backfill	11,800 C.Y.	$ 12/C.Y.	161,400
10.	Off-site disposal of wood/ roofing/steel	L.S.		6,000
11.	Cleaning, drain hole installation and sealing concrete surfaces	L.S.		29,500
12.	Site capping area	0		
13.	Encapsulation control area	0		
14.	Additional excavation/ placement and compaction of fill required for encapsulation area	0		
15.	Topsoil/seeding/erosion control	23,000 S.Y.	$ 2.50/S.Y.	57,500
16.	Drainage swale	L.S.		7,400
17.	Fencing	L.S.		18,200
18.	Flood controls	L.S.		12,000
19.	Clearing	L.S.		10,000
20.	On-site lab mobilization and demobilization	L.S.		12,000
21.	Soil testing	270 samples	$ 50/sample	13,500
22.	Monitoring well new construction/backfilling of existing not required wells	6 wells (backfilled)	$ 250/well	1,500
23.	Soil cover for foundations of Buildings 1 and 3 (includes flow zone) [5]			30,000
	Subtotal			$ 4,360,300
	Mobilization, demobilization, and site services (22%)			595,4000
	Subtotal			$ 5,320,200
	Insurance, bonds, permits (2%)			106,000
	Overhead and profit (10%) [4]			156,000
	Subtotal			$ 5,582,200
	Contingency (15%)			818,800
	Total			$ 6,401,000

1. If an incineration facility is used for disposal of regulated soils, the following cost estimate revisions apply: Item 1 Unit Cost = $ 1,470/ton
   Item 1 Total Cost = $28,300,000
2. If a solid waste landfill is designated for disposal of low level soils, the following cost estimate revisions apply: Item 2 Unit Cost = $ 30/ton
   Item 2 Total Cost = $ 18,000
3. Includes filling two on-site tunnels.
4. Not applied to disposal costs for soils (Items 1, 2 and 5).
5. See Appendix for details

PUBLIC COMMENTS

During the public comment period of the Feasibility Study Report, letters were received by EPA from the Mayor and Councilmen of the Borough of Old Forge and the Old Forge PCB Committee. A petition was also received with approximately two hundred signatures of residents from the Borough of Old Forge.

Basically, all correspondence addresses the level of PCB concentrations in the soil which will be left on-site. The alternatives evaluated in the Feasibility Study were based upon soil with PCB concentrations of fifty parts per million and ten parts per million. The community insists that the clean-up alternative selected be one which calls for the removal from the site of all soils with a PCB concentration of ten parts per million or greater.

The alternative that the Region is recommending is for removal of soils from the site based on a fifty parts per million or greater PCB concentration, and additional excavation and removal where it is determined to be cost-effective.

On Monday, January 31st, a meeting with the Old Forge PCB Committee was conducted to explain alternative 4 (modified). Based upon their positive reaction, we believe that this alternative, if chosen to be implemented, will be acceptable to the PCB Committee and the community.

Copies of the correspondence are included in this attachment.

ATTACHMENT C

Minority Caucus Secretary

22ND DISTRICT
ROBERT J. MELLOW
300 MILLER BUILDING
420 SPRUCE STREET
SCRANTON, PA 18503

COMMITTEES

APPROPRIATIONS
ENVIRONMENTAL RESOURCES & ENERGY
LAW & JUSTICE
URBAN AFFAIRS & HOUSING

Senate of Pennsylvania

January 20, 1983

Mr. Anthony S. Bartolomeo
U.S. Environmental Protection Agency
Region III
Philadelphia, PA 19106

Re: Phase II, Cleanup
Lehigh Electric Site
Old Forge, PA

Dear Mr. Bartolomeo:

As the State Senator representing Lackawanna County and specifically the Borough of Old Forge and after hearing the report by my assistant who attended the public hearing held by the EPA in Old Forge on January 10th regarding Phase II of the cleanup of the Lehigh Electric site, I would like to go on record as supporting Alternate #3 as the best and potentially safest method for cleanup.

I agree wholeheartedly with the P.C.B. Committee and Old Forge Borough officials that the contaminated soil should be removed down to 10 PPM or less. In addition there should be site capping along with the demolition of on-site buildings.

I am giving the P.C.B. Committee and the citizens of Old Forge my full support and stand ready to assist them in their quest for a cleaner and environmentaly safe community.

Sincerely,

Robert J. Mellow

BOROUGH OF OLD FORGE
TOWN HALL

310 SOUTH MAIN STREET
OLD FORGE, PA. — 18518
Phone: Area Code 717 — 457-7441

January 13. 1983

Dear Sirs:

We, the elected officials of the Borough of Old Forge, Pa., after attending the public hearing held by the EPA in Old Forge on January 10, 1983, regarding Phase 2 of the cleanup of "the most grossly contaminated" site on the Eastern Seaboard known as Lehigh Electric, and after hearing the pros and cons of the methods for such cleanup, have decided that the best and potentially safest method for cleanup is Alternate No. 3. We also agree that the contaminated soil should be removed down to 10 PPM or less. To settle for anything less than this would not be in the best interests of our constituents.

We are giving the PCB Committee and the people who reside near the Lehigh Electric site our full support and are in complete agreement with the facts set forth in the enclosed letter.

Sincerely.

Frank D. Gennaro, Mayor
Andrew Allen, Councilman
Joe Lacony, Councilman
Jerry Jerrusalem, Councilman
Karl Patto
Leonard Petrini, Jr.
Alex Doffera

Just so there are no misunderstandings, we are enclosing this with our letter so you can see for yourselves that we have clearly defined the only method of clean up that we can accept for this neighborhood.

ONLY ACCEPTABLE CLEAN UP METHOD:

ALTERNATIVE METHOD NO. THREE (3).
REMOVAL OF SOIL TO 10 ppm OR LESS AND SITE CAPPING.
DEMOLITION OF ON-SITE BUILDINGS.

Clean-Up Alternatives Developed

- No Action
- Remove Soil to 10 PPM & Site Management
- Remove Soil to 10 PPM & Site Capping
- Remove Soil to 50 PPM & Site Management
- Remove Soil to 50 PPM & Site Capping
- Remove Soil to 50 PPM & Encapsulation Of 10 to 50 PPM & Site Management

This Method Only

15

January 11, 1983

Mr. Anthony S. Bartolomeo
U.S. Environmental Protection Agency
Region III
Philadelphia, Pennsylvania 19106

Dear Mr. Bartolomeo:

We, of the PCB Committee, are writing in behalf of the residents of Old Forge, Pa., whose backyards are adjacent to what EPA has termed "the most grossly contaminated site on the eastern seaboard" -- Lehigh Electric. After meeting with the people of this neighborhood, who have been victimized for the past 25 years due to their 24 hour-7 day week exposure to the dreaded hazardous toxic chemical PCB.

We have banded together and are not requesting, but demanding, our Constitutional Rights not be violated by EPA. We feel that the only safe level of PCB in the soil at Lehigh Electric should be zero to be considered environmentally safe; but being realistic enough to realize that this soil can never be returned to its natural state, the only level we can accept is 10 ppm or less. If the accepted level to be left in the soil at Lehigh Electric after Phase II is to be anything higher, this neighborhood will live in fear and severe mental anguish for the rest of our natural lives. Since no one can actually come forward and tell us what levels are safe and how many parts per million are acceptable, we have conferred with the residents and have agreed to cooperate and compromise with EPA. We have

accepted the decision of the residents that the only level they can agree upon (knowing that this may not be safe enough) is 10 ppm or less. (Remove Soil to 10 ppm or less and Site Capping) Alternative Method No. Three (3).

Our children's lives are at stake and their children's lives, etc. We cannot allow this -- if we did we would feel ashamed and humiliated that we did not do everything in our power to provide the safest environment possible for our future generations. EPA cannot give us any written guarantees about our future, and we are intelligent enough not to ask for any, because there are no guarantees in this life -- but there is such a thing as preventive measures, and that is all we are asking for.

EPA can only speculate that the clean up measure they plan to put into effect for Lehigh Electric will be environmentally safe, but that is all they can do -- they cannot tell us what may happen 10, 20, 50 or 100 years from now. We must look toward the future. Our forefathers paved the way for us -- for us to leave a legacy of a potential life of sickness, birth defects and untimely deaths would be ludicrous. This we cannot and will not allow. If EPA feels that 50 ppm is a safe legacy for future generations, we feel that EPA should make this credible and put their beliefs in writing so that this neighborhood can be relieved of some of the fear and mental anguish that it is now experiencing. We feel that this is a legitimate request. If EPA refuses to do this, something is amiss. Anything that we believe in, we are not afraid to commit ourselves to by putting these beliefs and facts on paper (such as this letter).

This neighborhood has suffered enough. Remove the price tag from our heads and allow us to return to our lives on an almost normal basis again -- for we can never go back to the heppy-go-lucky people we once were. Enough is enough. Why does EPA insist on punishing us, the innocent victims? Even though we have reached the end of our rope, we are going to tie a knot and hang on. We are through being pawns in EPA's manipulative games, and refuse to be used any longer as stepping stones while EPA tries to cleanse its reputation. It is time for them to reverse this policy and use this time and energy towards cleansing all the hazardous toxic chemicals that are slowly destroying the people of this country. We will no longer tolerate their hurry up and wait forever policy. The time has now come for EPA to justify its name -- Environmental Protection Agency. Words without results are meaningless.

Through what EPA quotes as being "scientific expertise", they have set standards and deemed certain concentrations as safe levels. But we researched enough to know that science has not found any levels that can be considered safe. We are sure that you are fully aware that science is a practice, not an art. The burden of proof does not rest with us, but with the ENVIRONMENTAL PROTECTION AGENCY.

Due to the cummulative nature of PCB's when considered in relation to the young ages of our children, in all logic calculates to serious health problems that can occur after a

lifetime of exposure. So you can understand why we do not appreciate EPA's speculations. These speculations may be considered "scientific expertise" if they were to be applied to commodities, the money market, etc. Even then they are still gambling -- but to gamble away human lives through speculation -- for shame.

EPA heavily emphasizes the cradle to the grave philosophy pertaining to hazardous toxic waste. We believe this EPA saying to mean seeing such wastes from contaminated sites safely delivered and put into approved landfills. Because EPA spews cost effectiveness first and human life last, we can only assume that they interpret this philosophy as meaning putting our children from the cradle into the grave. The Federal Government spends millions of dollars to protect wildlife and animals that they consider to be rapidly becoming extinct. (WE ARE ALL FOR THIS). Yet we cannot understand their logic when they refuse to spend an extra million dollars to keep our future generations from becoming extinct. We would be living a lie the rest of our lives if we agreed to settle for anything more than 10 ppm or less during Phase II of clean up at the Lehigh Electric Site. You can surely comprehend that we cannot, WE WILL NOT accept, from an agency created to protect us, anything less than removing the contaminated soil down to 10 ppm or less. We are justified under the circumstances in demanding our Constitutional Rights

and we will not allow even EPA to take these rights away from us.

Even though EPA may have our best interests at heart, who better than the people that must live here the rest of our lives, should determine what is best for them. Remember, it isn't as though we are fortunate enough to have just visited the Lehigh Electric Site, extend our sympathy, and then be able to leave.

We are sure you understand the gravity of the situation, and will do the just and proper thing by honoring our justifiable demands.

Sincerely,

THE PCB COMMITTEE

Marie Skutack Marie Skutack
Lucille Yager Lucille Yager
Ann Marie Jordan Ann Marie Jordan
Helen Tansley Helen Tansley
Ruth Chipp Ruth Chipp
Roberta Skutack Roberta Skutack

P.S. Can you blame us? If you were in our shoes, which fortunately you are not, wouldn't you fight tooth and nail to preserve human lives, and echo the sentiments of this victimized neighborhood?

Joseph Yager 928 Howard St, O.F.
Andrea Yager (age 8) (signed by father)
Joel Yager (age 5) (signed by father)
Irene T. Puchowski 150 Howard St. Old Forge, Pa
Stephen Puchowski 150 Howard St. Old Forge, Pa
Mark Puchowski 150 Howard St. Old Forge Pa (signed by mother)
Laura Jackowski R. 230 Forge St, Old Forge, Pa.
Paul Jackowski Jr. (age 3) R. (signed by mother)
Melissa Jackowski (age 2) (signed by mother)
Matthew Jackowski (age 1) (signed by mother)
Kathie Bullock 208 Forge St Old Forge Pa
Lisa Alexander 208 Forge St. Old Forge Pa
Wanda Alfonso 208 Forge St. Old Forge Pa
Fred Castanzi 214 Howard St. O.F.
Fred Castanzi Sr. " " signed by father
Donna Castanzi " " " "
Lori Castanzi " " " "
Sandi Castanzi " " " "
Rosemary Cassetta 143 Howard St O.F.
Theresa Puma 148 Howard St. O.F.
Irene Pennini 133 Howard Old Forge. signed by daughter
Anita Cassetta 144 Howard St. Old Forge
Celest Cassetta 143 Howard St. Old Forge Pa.
Emiliano Dunston 142 Howard St Old Forge PA
Joseph D Perfetto 118 Howard St Old Forge Pa.
Joseph P. Chipp 132 Howard St. Old Forge, Pa.
Joseph Tansley 132 Forge St. Old Forge Pa
Mary Sabella 116 Howard St Old Forge, Pa
Wanda Copparoni 59 Depot St Old Forge, PA.

22

George Kress 110 Howard St Old Forge Pa
Mary Davis 110 Howard st Old Forge Pa,
Tina Jordan 138 Howard St Old Forge Pa signed by mother
Sherry Jordan 138 Howard St Old Forge Pa signed by mother
FRanke Jordan 138 Howard St Old Forge Pa signed by mother
Brenda Jordan 138 " " " " " "
John Jordan 138 " " " " " "
Frank Jordan 138 " " " "
Cheryl Barcoski 126 Forge St. Old Forge Pa. mother
Henry Barcoski 126 Forge St. Old Forge Pa. Father
Michelle Barcoski 126 Forge St. Old Forge Pa. Daughter
Dave Skutack 128 Forge St. Old Forge Pa.
Robert Skutack 128 Forge St. Old Forge Pa mother of BoB
Helen Tansley 132 Forge St. Old Forge, Pa.
Deborah Tansley 132 Forge St. Old Forge, Pa. } 15/
Kevin Tansley 132 Forge St. Old Forge, PA. } mother of
Jason Tansley 132 Forge St. Old Forge, Pa.
Helen O Dell 132 Forge St Old Forge Pa.
Marie Killeen 914 R. So. Main Old Forge, Pa. 18518
Carl Killeen 914 R-S main st. " " .. age 14
Sal Killeen Jr. 914 R-So. main st. " " age 18
Thelma Smith 914 R. So. main st
Dominic Killeen 914 R. So. main ~~st~~

Eugene Jenkins 912 S Main St Old Forge
Eugene Jenkins Signed by father
Kimberly Ann Jenkins " " "
Tara Jenkins " " "
Peter Rohland 302 Kennedy St - Old Forge
Veronica Rohland "
William Rohland Signed by Father "
Peter Rohland Jr. " " " " "
Joseph Gettier 139 Moosic Rd
Frank Norton 126 Wright St. Duryea
Thomas J MacDonald 985 Moosic Road Old Forge
Sally Gray 937 South Main St.
Joseph L. Gray 931 South Main St
Garfield Hughes 945 So. Main St.
Sabra Hughes 945 So. Main St.
Robert Hughes 6 Della Dr.
Lucy Hughes 942 S main St.
Dewy Hughes 942 S Main St.
Patricia Latona 942 S Main St (Mother)
Michele Latona 942 S Main St
Susan Trzenski R, 1215 S. Main St.
Andrea Kuckle 1232 S. Main St.

Edda Caprari 1138 S Main St. Old Forge
Lena Rogo 1138 S. Main St Old Forge
Grayce Butler 209 Bridge St. Old Forge
Loretta Dennigan 106 Fordell St. Old Forge
Kate Pagnotti 117 Harrison St Old Forge
Helen Amanda 214 Charles St Old Forge Pa
Jenni A. Rogo 115 Miles St Old Forge, Pa
Elizabeth Malecki 115 Mary St. Old Forge, Pa
Celia Scocia 214 Hoover st Old Forge Pa
Joseph Kvedla Age 12, 1232 S. Main St., Old Forge P/mother
Matthew Kvedla Age 11, 1232 So. Main St, Old Forge, Pa P/mother
Peter Kvedla, Age 10, 1232 So. Main St, Old Forge, Pa P/mother
Adriana Kvedla, 4, 1232 S. Main St, Old Forge, Pa. P/mother
Joe Kvedla 1232 S. Main St. Old Forge Pa
Natalie Maccirlo 1228 S. Main St Old Forge Pa/Smother
John Maccirlo Jr. 1228 S Main St Old Forge S/mother
Eleanor Maccirlo 1228 S Main St Old Forge S/mother
John Maccirlo 1228 S Main St. Old Forge S/mother
Angela Caprari 1232 S. Main St. Old Forge, Pa.
Kathleen Lamberti 101 Howard St. Old Forge, PA.
Philip Lamberti " "
James Lamberti " "
Nicholas Lamberti
Matthew Lamberti " "
Lori Lamberti " "
Michael Lamberti " "

S/mother

Ronnie Morelli	135 Howard St. Old Forge.
Danielle Morelli	Signed by father -
Elaine M. Morelli	135 Howard St. Old Forge
Bradley Morelli	135 1/2 Howard St. Old Forge
John Morelli	135 1/2 Howard St. Old Forge R
Randy Morelle	" " " "
Susan Morelli	137 Howard St. Old Forge
Ezio Morelli	" " " "
Caroline Morelli	" " " "
Octavio Morelli	134 HOWARD ST OLD FORGE
Patricia Lane	148 Howard St Old Forge
Frank Lane	148 Howard St. old Forge
Kathleen Lane	" "
Mark Lane	148 Howard St old Forge
Mary Ellen Lane	" " Signed by
Joseph Lane	" " Mother
Margaret Motor	145 Howard St. Old Forge Co.
Karen Hunold	R-213 Howard St. Old Forge, Pa.
Kim Hunold -	— — —
Glenn Hunold	— — —
Thomas Hyaley	210 Forge St. Old Forge Pa
Glenn Gray	200 Forge St Old Forge Pa
Barre Gray	200 Forge St Old Forge Pa
Glen Gray	134 1/2 200 Forge St Old Forge Pa

25-a

Dona Gray 10yrs 200 Forge Pl Old Forge (mother)
Scott Gray 3yrs 200 Forge St Old Forge (mother)
Marilyn Matone 125 Howard St Old Forge
Gene Matone 125 Howard St Old Forge
Heather Matone 125 Howard St Old Forge
Ryan Matone 125 Howard St Old Forge, Pa.
John Caprani Jr (former resident) Nazareth, Pa.
Helen J Hall 200 Mary St O.F former resident of 128 Forge St for 25yrs.
Raymond Hall 200 Mary St. O.F former resident of 128 Forge St.

Swore and Subscribed
on 13TH Jan 1953.
Frank J Talerico
312 N. Main St
Old Forge
Pa

Com exp
4TH Jan
1958.

[illegible] F. TALERICO
[illegible] ORT 45-1-01
312 N. MAIN AVENUE
OLD FORGE, PENNA. 18518

MY COMMISSION EXPIRES JAN. 4, 1958

Signatures of above
Witnessed by the Following

1. Geraldine Jordan
2. Roberta Skutack
3. Ruth Chiff

Frank J Talerico
312 N. Forge St
Old Forge
Pa

Com exp 4TH Jan 1958

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Draft Risk Assessment for Lehigh Electric Co. Superfund Site

February 10, 1983

I. INTRODUCTION

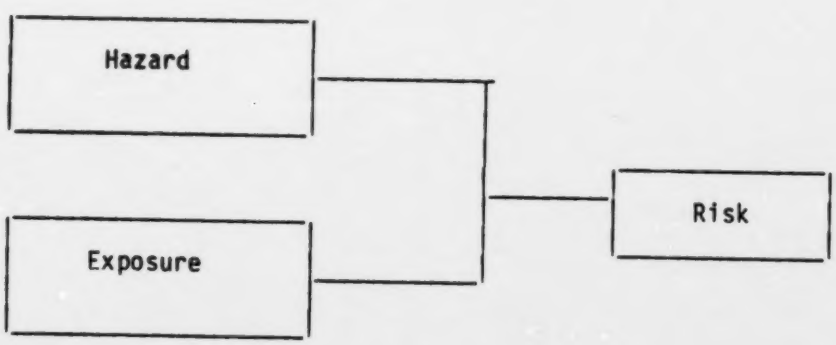
The purpose of this document is to provide an estimate of the risk associated with the PCB contamination at the Lehigh Electric Co. site near Old Forge, PA. The paper includes a discussion of the reduction in risk likely to result from the planned remedial action.

The Lehigh Electric Co. site has been under study as a Superfund site for more than 2 years. The site had been used as an unsheltered storage location for many pieces of electrical equipment; e.g. transformers and capacitors. Over a period of time, the containers were breached and high concentrations of polychlorinated biphenyls (PCBs) spilled onto the ground.

The Agency initially erected a fence around the contaminated area in April 1981. Since then, action has been taken to remove PCBs from the site. In Phase I the major pieces of electrical equipment were removed and disposed of. In Phase II the Agency obtained vertical PCB concentration profiles from sample borings taken from 50' x 50' grid sections laid out on the site. Further, ground water monitoring wells were drilled and sampled for PCBs, and water and sediment samples from the nearby Lackawana River were analyzed for possible PCB contamination.

The Agency has now considered a number of options for further remedial work at the site. This document assesses the risk associated with the current situation, the "no action option", and in a more general manner, the risk associated with a vigorous remedial option.

The risk that exists in a given situation is a function of the hazard(s) of the substance(s) involved and the exposure to those toxicants which the target (often humans) may encounter.



Therefore, this document consists of sections devoted to hazards of PCBs, likely exposure to PCBs at the Lehigh Electroc Co. site, and the

anticipated risk. While considerable information is available on the toxicity of PCBs (i.e. hazard information), our knowledge is certainly not complete. Similarily, our knowledge of factors affecting potential exposures is also imperfect. Consequently, it is necessary to make certain assumptions in order to fill in these data gaps: A conscious effort has been made to make these assumptions in such a way that they will err on the side of public safety. These assumptions are summarized in tables in the sections that follow. NOTE: Any attempt to interpret the results of this risk asessment without a full appreciation of these assumptions would constitute a misuse of this information.

II. HAZARD INFORMATION

Both animal experimentation and human experience attest to the toxicity of PCBs. Given the 10 different homologues possible, many with a large number of isomers, the problem of specifying the toxicity of each congener is a challenge which has yet to be met, let alone addressing the question of synergism which may appear in the complex mixtures we call "PCBs". Most PCBs entered the environment as components of electircal equipment coolants/dielectrics which were of generally well defined composition; e.g. Arachlors and Kanechlors. Many of the studies have been conducted with these electrical use mixtures, the most likely source of contamination at the Lehigh site. A number of thorough reviews of this topic have been published.

A. Human Data

The majority of people living in the United States carry detectable levels of PCBs in their bodies. The sources of these substances include occupational exposure and dietary intake. The effects of these low levels in the body are generally unknown, being masked, if present, by exposures to a myriad of other insults and natural processes in addition to PCBs.

In some cases, however, high, inadvertant exposures have resulted in manifest effects attributable to PCBs and/or their contaminants. In the 1960s and 1970s a group of Japanese and a group of Taiwanese were independently exposed to PCBs in contaminated cooking oil. Among the clinical symptoms which resulted were chloracne (a persistent form of acne), eye discharges, skin discoloration, liver dysfunction, abdominal pain, and neurological problems. Some children born to exposed mothers exhibited a temporary skin discoloration. The exposed populations continue to be followed to assess any chronic effects.

B. Animal Data

Animal studies have the advantage of controlled exposures which permit the determination of dose-exposure relationships. A disadvantage is that the results obtained from the non-human must be extrapolated to the human situation.

Many PCB studies have been conducted using several animals species. The effects noted are similar to those observed with a side variety of chlorinated polycyclic aromatic substances; particularly,

currently working with Canada to extend these studies, using a colony of some 80 monkeys.

The lowest observed effect level (LOEL) in these studies is approximately 1 ppm in the diet or, roughly, .05 mg/kg-d.

Quantitative risk extrapolation is not usually performed with data on reproductive effects. Rather, a measure of the risk involved is presented as a ratio between the LOEL (in this case) and the estimated exposure.

III. EXPOSURE

No matter how hazardous a substance might be, if it never comes into contact with people, the human health risk will be zero. Therefore, the extent of the health risk posed by the PCBs at the Lehigh Electric Co. site depends on the extent to which people come into contact with them; i.e. the exposure.

Because it is not possible to foresee all possible eventualities that might result in exposure to the Lehigh Electric PCBs, two separate scenarios will be presented to indicate reasonable levels of exposure for the "no action" option. The first of these scenarios is built on relatively high exposure, low probability assumptions. This scenario might be referred to as "plausible, worst case". A second senario is based on more moderate exposures and is more likely to represent a real situation at the site.

Both scenarios make use of the data collected at the site by EPA and/or its contractor.

The section closes with a discussion of anticipated exposure after remedial work.

A. The Data

After removal of the electrical equipment from the site during Phase I of the cleanup, the Agency obtained bore samplings from each grid. Bore samples were taken down to a depth at which the PCB concentration fell below 10 ppm. A conscious effort was made to drill at points on the sections which are most visually contaminated.

Positive values of PCB residues were found in the sediments of the nearby Lackawana River. This contamination could have resulted from erosion of contaminated soil from the elevated site.

Calculations based upon these data suggest that the magnitude of PCBs in the contaminated area is 25,000kg.

The point of highest concentration of PCBs in the soil on the surface was measured at 110,000 ppm (or 11% PCBs). The average concentration of PCBs on the surface of the sections which were found to be contaminated at levels in excess of 50 ppm was calculated to be approximately 3700 ppm.

B. Exposure Scenarios Under "No Action" Option

Although the area is currently fenced, the boundary clearly has been breached on more than one occasion. In the following scenarios the assumption is made that people can contact the contaminated soil for 1 hr/d for 180d/yr (to account for ice and snow cover in winter, aperiodic access to the site, etc.).

The possible routes of exposure which must be considered are ingestive, dermal absorption, and inhalation. Tables I & II lay out the assumptions used in the two scenarios. Table III lays out additional assumptions which are common to both scenarios.

TABLE I

Assumptions for Plausible Worst Case

Ingestion assumptions
- 1 g soil daily for 3 years (child)
- .5g soil daily for 7 years (youngster)
- .1g soil daily for 10 years (adult -- less likely to be in the area)
- 100% of PCBs on soil are biologically available

Dermal Assumptions
- 1g soil on skin daily for 20 years in a lifetime
- 10% of PCBs penetrate skin

Inhalation Assumptions
- Breathing rate while in the area $20m^3/d$
- Dust level in the air is 100 micrograms/m^3; at ambient air standard of 75 micrograms/m^3
- All particles can be inhaled
- All particles inhaled are retained
- All PCBs on retained particles become biologically available

TABLE II

Assumptions for More Likely Scenario

Ingestion Assumptions
- .1g daily for 20 years in a lifetime
- 100% of PCBs on soil are biologically available

Dermal Assumptions
- .1g soil on skin daily for 20 years in a lifetime
- 1% of PCBs penetrate skin

Inhalation Assumption
- Same as Table I

TABLE III

Other Assumptions Common to Both Scenarios

70kg per person ("Fine tuning" the weight over a lifetime is assumed to have a negligible effect on the significance of the data)

1hr exposure per day for 182 days per year

In addition to these direct exposures to humans, there exists the possibility of indirect exposures via contaminated wild game, fish, vegetation, etc. The extent of this exposure cannot be evaluated at this point due to lack of information on fish harvesting from the river, PCB levels in game, the potential for the site to serve as a current or future source of vegetation that would eventually reach humans, etc. The reader should be aware that a potential for additional exposure may exist via these indirect routes, although they are not expected to be as large as that from direct routes.

CALCULATIONS

Plausible Worst Case

Ingestion

$$\text{Lifetime Daily Dose} = \frac{1\text{g soil}}{\text{daily}} \times (\text{Conc. PCB in soil}) \times (182/365)\ 3\text{yrs}/70\text{yrs}$$

$$+ \frac{.5\text{g soil}}{\text{day}} \times (\text{Conc. PCB in soil}) \times (182/365)\ 7\text{yrs}/70\text{yrs}$$

$$+ \frac{.1\text{g soil}}{\text{day}} \times (\text{Conc. PCB in soil}) \times (182/365)\ 10\text{yrs}/20\text{yrs}$$

$$\div\ 70\text{kg}$$

$$= \left[\left(\frac{1000\text{ mg soil}}{\text{d}} \times \frac{1}{2} \times \frac{3}{70}\right) + \left(\frac{500\text{ mg soil}}{\text{d}} \times \frac{1}{2} \times \frac{1}{10}\right) + \left(\frac{100\text{ mg soil}}{\text{d}} \times \frac{1}{2} \times \frac{1}{7}\right)\right]$$

$$\text{Conc. PCB} \div 70\text{kg}$$

$$= \left[21\ \frac{\text{mg soil}}{\text{d}} + 25\ \frac{\text{mg soil}}{\text{d}} + 7\ \frac{\text{mg soil}}{\text{d}}\right] (\text{Conc. PCB})/70\text{kg}$$

$$= .75\ (\text{Conc. PCB})\ \frac{\text{mg PCB}}{\text{kg-d}}$$

Where Conc. PCB is expressed in units of $\frac{\text{mg PCB}}{\text{mg soil}}$

Dermal

$$\text{Lifetime Daily Dose} = \frac{100\text{ mg soil} \times (\text{Conc. PCB in soil}) \times \frac{182\text{d}}{365\text{d}} \times \frac{20\text{yr}}{70\text{yr}} \times 10\%}{70\text{kg}}$$

$$= .2\ (\text{Conc. PCB})\ \frac{\text{mg PCB}}{\text{kg-d}}$$

Where Conc. PCB is expressed in units of $\frac{\text{mg PCB}}{\text{mg soil}}$

Inhalation

$$\text{Lifetime Daily Dose} = \frac{20\ \frac{\text{m}^3}{\text{d}} \times \frac{1\text{hr}}{\text{d}} \times \frac{\text{d}}{24\text{hr}} \times \frac{182\text{d}}{365\text{d}} \times \frac{20\text{yrs}}{70\text{yrs}} \times \frac{100\text{mg soil}}{\text{m}^3} \times \text{Conc. PCB}}{70\text{kg}}$$

$$= .0002\ (\text{Conc. PCB})\ \text{mg PCB/k-d}$$

Where conc. PCB is expressed in units of $\frac{\text{mg PCB}}{\text{mg soil}}$

Note that the inhalation dose is negligible compared to the ingestion or dermal routes. Therefore, the combined dose is essentially:

Total Lifetime Dose = .95 (Conc. of PCB) $\frac{\text{mg PCB}}{\text{kg-d}}$ (1)

Where Conc. PCB is expresed in units of $\frac{\text{mg PCB}}{\text{mg soil}}$

More likely scenario

Ingestion

Lifetime Daily Dose = 100 $\frac{\text{mg soil}}{\text{d}}$ x (Conc. PCB in soil) x $\frac{182\text{d}}{365\text{d}}$ x $\frac{20\text{yrs}}{70\text{yrs}}$/70kg

= .2 (Conc. PCB) $\frac{\text{mg PCB}}{\text{kg-d}}$

Dermal

Lifetime Daily Dose = $\frac{100 \frac{\text{mg soil}}{\text{d}} \times \text{Conc. PCB in soil} \times \frac{182\text{d}}{365\text{d}} \times \frac{20\text{yrs}}{70\text{yrs}} \times 1\%}{70\text{kg}}$

= .02 (Conc. PCB) $\frac{\text{mg PCB}}{\text{kg-d}}$

Inhalation

Same as plausible worst case; still negligible.

Therefore, the total lifetime daily dose = .22 (Conc. PCB) $\frac{\text{mg PCB}}{\text{kg-d}}$ (2)

Where Conc. PCB is expressed as $\frac{\text{mg PCB}}{\text{mg soil}}$

C. Exposure After Remedial Work

The planned remedial option involves excavating down to a level of from one to 14 feet until the PCB concentration in the remaining contaminated soil is somewhere between 10 and 50 ppm. The estimated amount of PCBs which will be removed is 27 tons. This implies that about 98% of the original amount will remain.

The excavation will then be backfilled with PCB free dirt. Subsequently, the entire lot (excavated and non-excavated) will be covered with 6" of fresh soil and seeded.

Once this remedial work is completed, the surface concentrations of PCBs from the site will be essentially zero, and hence the risk from direct exposure will also be essentially zero.

The possibility of movement of any remaining PCBs through the ground water is not considered likely, given the relatively strong binding properties of PCBs to soil, in relation to their relatively low solubilities in water.

It is conceivable that over time, PCBs could co-vaporize with water in the soil and rise to the surface. This is likely to be a very slow process and, given the low amount of PCBs remaining in the soil at the excavated depths and the fact that PCBs would vaporize and move off-site at very low concentrations, it is not thought that PCBs would ever again be present at the surface in concentrations that would be of concern.

IV. RISK

As mentioned above, the CAG of EPA has determined an upper limit to the excess risk from cancer due to PCBs to be the Lifetime Daily Dose.

Upper limit of Cancer Risk = 4.35 $(mg/kg\text{-}d)^{-1}$ (Lifetime Daily Dose) (3)

Where Lifetime Daily Dose is expressed in limits of mg/kg-d.

This relationship holds at low doses. At higher doses where the dose-response function is sublinear, the equation over-estimates the upper limit of the risk. Given the coarseness in the rest of the risk assessment presented here, however, the non-linear correction has not been made in this paper. The effect of this is to introduce another conservative assumption.

Figure I illustrates the upper limit of the excess cancer risk of both the plausible worst case scenario and the more likely scenario as a function of concentrations of PCBs in the soil. The verticle lines at 110,000 ppm and 3700 ppm represent, respectively, the dose at the "hottest" spot found and the average of the doses at each of the grid sections which showed concentrations of PCBs in excess of 50ppm.

Note that the ordinate also displays values for the ratio (CR) of the LOEL to the anticipated dose. The greater the value of the ratio, the greater is one's confidence that the exposures are not significant from a direct human health perspective.

For the plausible worst case scenario, therefore, we have [using eq (1) in eq (3)]

Upper limit of excess cancer risk = 4.35 x .95 x Conc. PCB (4)
= 4.1 x Conc. PCB

Similarly, for the more likely scenario, we have [using eq. (2) in eq (3)]:

Upper limit of excess cancer risk = 4.35 x .22 x Conc. PCB
= .96 x Conc. PCB (5)

V. DISCUSSION

Figure I illustrates that, within the bounds of the approximations used in this paper, exposures resulting from the "plausible worst case" and the "more likely scenario" give upper limits of excess cancer risk and measures of reproduction risks which are in the ranges that generally cause concern. This is true for both the highest points of contamination (110,000 ppm) and the averaged concentration (3,700 ppm).

Recall that the cancer estimates have not been corrected for non-linear behavior at high doses and, therefore, are overestimates to some degree. These corrections are not likely to reduce the upper limit estimates to levels which will no longer be of concern. Thus, is particularly true of the 110,000 ppm contamination level.

In any event, the measures of reproduction risk, the CR values, do not need to be corrected and, quite independently, they convey the same information: the "no action" option results in exposures which are of some concern. Generally, one would like to see CR values in excess of 100 or 1,000. The "no action" option results in CR values in the less than 1 to 100 range.

In sum, if the direct exposure scenario assumptions summarized in Tables I - III are accepted, the "no action" option is associated with risks of concern.

As stated above, the proposed remedial action will reduce surface concentrations to effectively zero. Hence, the risk from direct exposure will also be effectively zero. We have noted that there is some possibility for indirect exposures and, possibly, finite direct exposures over-time. For reasons cited in Section III C, however, these exposures (and hence the risks) are not likely to be significant.

VI. CONCLUSION

The proposed remedial action will markedly reduce most (perhaps all) of the risk, which is of likely concern at the Lehigh Electric Site.

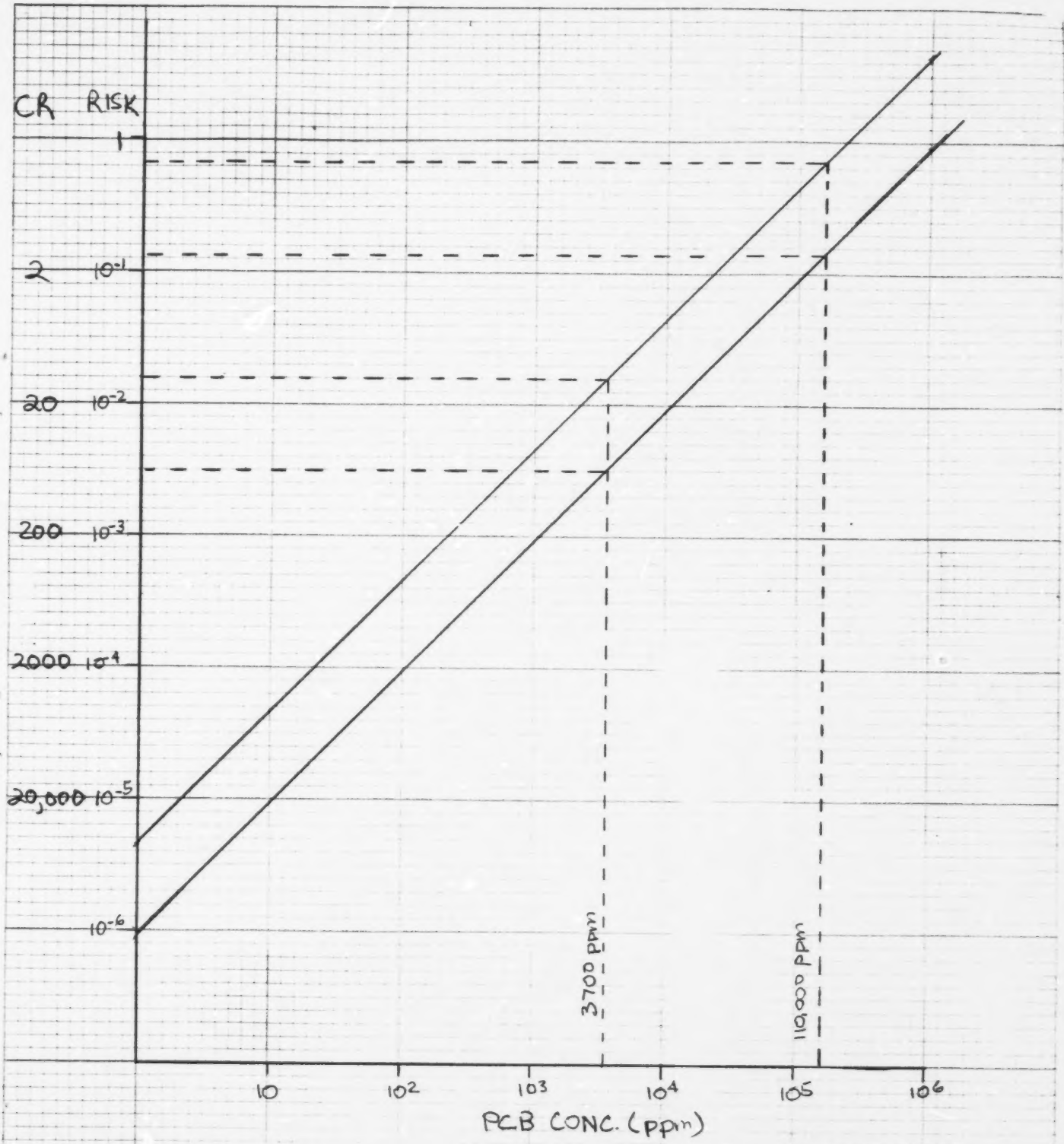


FIGURE 1 – MEASURES OF CANCER + REPRODUCTION RISK ASSOCIATED WITH DIRECT EXPOSURE TO VARIOUS SURFACE LEVEL CONC. OF PCBs IN LEHIGH ELECTRIC Co. SOIL *

* This figure cannot be adequately interpreted without an appreciation of the assumptions in Tables I-III and caveats elsewhere in the text.